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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/071,014	02/07/2002	Peter L. Fu	005858P7148	8752

7590 06/28/2005

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EXAMINER

MCLEAN MAYO, KIMBERLY N

ART UNIT	PAPER NUMBER
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2187

DATE MAILED: 06/28/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/071,014	FU, PETER L.	
	Examiner	Art Unit	
	Kimberly N. McLean-Mayo	2187	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 March 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 3-13 and 20-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 3-13 and 20-22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on March 28, 2005 has been entered.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 9 and 11 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

4. Claim 9 recites the limitation "the cache line and the data" in line 1. There is insufficient antecedent basis for this limitation in the claim.

Is it the first cache line or the duplicate cache line and is it the data in the first cache line or the duplicate cache line?

5. Claim 11 recites the limitation "the data" in line 2. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 3-5, 8-9, 12-13 and 20-22 are rejected under 35 U.S.C. 102(b) as being anticipated by Liong et al. (USPN: 5,784,548).

Regarding claims 3, 8-9 and 20, Liong discloses reading data from a first dirty cache line in a cache memory (Figure 8, Reference 605; C 7, L 20-24; Liong discloses that the system uses a write-back caching method and that the data stored in the cache maybe dirty; hence the method does apply to dirty cache lines); determining if the data is corrupt and marking the first dirty cache line invalid if the data is corrupt (C 7, L 20-30; Figure 8, Reference 606; the dirty cache line is marked invalid via the incorrect parity bit); determining if a duplicate cache line exists (inherent, the system maintains a mirrored cache system); determining if the data within the duplicate cache line is corrupt if the duplicate cache line exists (C 7, L 16-45; Figure 8, References 609 and 610); writing the data within the duplicate cache line to a first location in memory if the duplicate line is not corrupt (C Figure 8, Reference 611; when the system is performing a write-back request to memory [C 7, L 30-33], the duplicate cache line is output and written to main memory); and marking the first dirty cache line available (C 8, L 4-6; when the corrupted first dirty cache line is overwritten with the correct data and parity bit; the correct parity bit indicates that the cache line is available).

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Regarding claims 4-5, 12 and 22, Liong discloses if the data from the first dirty cache line is not corrupt then writing the data from the first dirty cache line to the first memory location (Figure 8, References 606, 607 and 608); marking the first dirty cache line available (the correct parity bit indicates that the first dirty cache line is available); determining at least one duplicate dirty cache line for the first dirty cache line and marking each duplicate dirty cache line as an available cache line (the system inherently determines that a duplicate cache line exists because the system maintains a mirrored cache and the duplicate cache line is marked valid when a correct parity bit is indicated for the duplicate dirty cache line); marking the duplicate dirty cache lines invalid if the data within the duplicate dirty cache line is corrupt (when the incorrect parity bit is set for the duplicate cache line, the duplicate dirty cache line is effectively marked invalid).

Regarding claim 21, Liong discloses invoking a replacement policy to free cache lines in the cache if there are no cache lines available (inherent; all caches perform a replacement policy to free cache lines).

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Liong (USPN: 5,784,548).

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Liong discloses the limitations cited above in claim 10, however, Liong does not disclose reading from a second cache line if the data is corrupt and the first cache line is clean. However it is well known in the art to perform such functions when performing a flush operation to main memory; only the dirty lines are output to memory, the remaining cache lines remain in the cache. An entire cache is flushed to memory to maintain cache coherency and hence, it would have been obvious to one of ordinary skill in the art to implement such a feature in Liong's system for the desirable purpose of cache coherency.

10. Claims 6, 7, 10 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Liong (USPN: 5,784,548) in view of Loechel (USPN: 5,895,485).

Regarding claims 6-7, 10 and 13, Liong discloses the limitation cited above but Liong does not disclose Loechel discloses determining that no duplicate cache line exists and terminating the method if a duplicate cache line is not found. However, Loechel does disclose determining that no duplicate cache line exists (C 10, L 44-46; determined as such when the cache is setup with write-back cache disabled) and terminating the method if a duplicate cache line is not found (the method is terminating since when there is no duplicate cache line, the cache is operating in a write-through mode). In Loechel's system, the system has the flexibility of operating in a write-back or write-through mode and hence in a write-through mode the above-indicated steps are not necessary since there is no dirty data to write back to memory. One of ordinary skill in the art would have recognized the flexibility afforded by Loechel's teachings and would have been motivated to use such teachings in the system taught by Liong for the desirable purpose of flexibility.

Response to Arguments

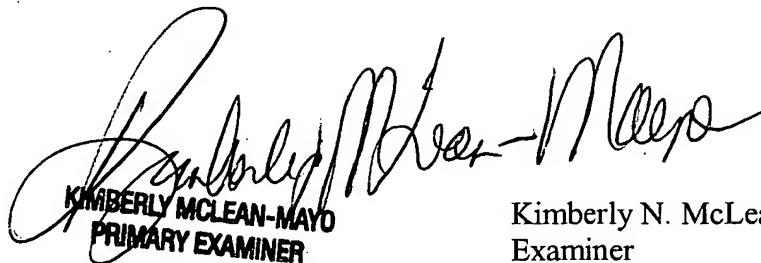
11. Applicant's arguments with respect to the claims have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kimberly N. McLean-Mayo whose telephone number is 703-308-9592. The examiner can normally be reached on M (10:00 - 6:30); Tues, Thr (10:00 - 4:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Donald Sparks can be reached on 703-308-1756. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



KIMBERLY MCLEAN-MAYO
PRIMARY EXAMINER

Kimberly N. McLean-Mayo
Examiner
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KNM

June 10, 2005